

Pre-operative Vitamin D and Calcium Administration in Patients Undergoing Thyroidectomy to Prevent Hypocalcemia: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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Abstract

Background: Post-thyroidectomy hypocalcemia is a common complication that results in adverse neurological and cardiac symptoms. The use of calcium and vitamin D has been proposed as a pre-operative preventative strategy for this complication.

Objective: To assess whether pre-operative administration of calcium and vitamin D prevents post-operative hypocalcemia.

Methods: Computerized search in Medline, Embase, and CENTRAL databases was performed. Randomized controlled trials (RCTs) comparing pre-operative calcium and Vitamin D administration with either placebo or no intervention were included.

Results: A total of 9 RCTs that enrolled 1079 patients were found eligible. Although post-operative laboratory hypocalcemia occurred less in patients who received pre-operative calcium and vitamin D, it was not found to be statistically significant (RR = 0.77, 95% CI: 0.60 to 1.00; P = 0.05). Mean post-operative calcium level was significantly higher in the intervention group (SMD = 0.10, 95% CI: 0.07 to 0.12; P=0.0001). The number of patients with symptomatic hypocalcemia was significantly lower in the intervention group (RR = 0.54, 95% CI: 0.38 to 0.76; P = 0.0005).

Conclusion: Administration of calcium and vitamin D pre-operatively achieves lower rates of post-thyroidectomy symptomatic hypocalcemia in comparison with placebo or no intervention.

Introduction

- Hypocalcemia is the most common complication following thyroidectomy.
- Hypocalcemia may manifest as neurological and cardiac symptoms.
- The use of calcium and vitamin D has been proposed as a pre-operative preventative strategy.

Primary Objectives

- To assess the rate of laboratory hypocalcemia.
- To assess the rate of symptomatic hypocalcemia.
- To assess the mean postoperative calcium levels.

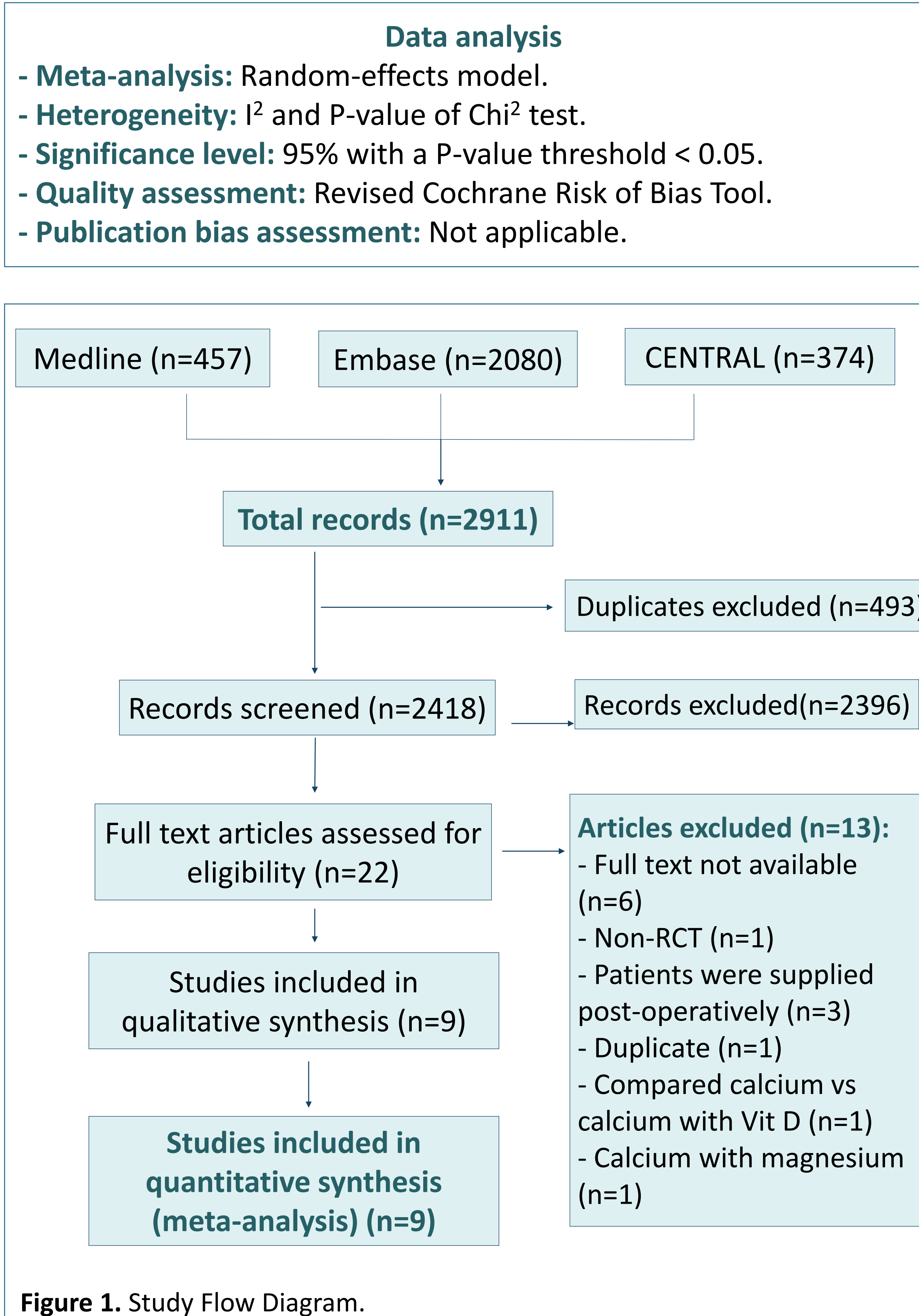
Methods and Materials

- This systematic review was done according to a pre-specified protocol following Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA). PROSPERO ID: CRD42022356363.

- **Population:** Adults 18 or above undergoing thyroidectomy.
- **Intervention:** Calcium, vitamin D, or both.
- **Comparison:** Placebo or no treatment.
- **Outcomes:** Symptomatic hypocalcemia, laboratory hypocalcemia, and mean calcium level.
- **Studies:** RCTs conducted in English.

Search Strategy

- The following databases were searched: MEDLINE, Embase, and Cochrane Central Register of Controlled Trials (CENTRAL).
- Last date of search: September 2022.



Results

Characteristics of Included Studies

- **Number of studies (fig.1):** 9 RCTs.
- **Total number of participants:** 1079 participants.
- **Study Arms:**
 - Intervention group: 541 (50.1%), control group: 538 (49.9%).
- **Mean age:** 23.79 to 59.34 years.
- **Gender distribution:**
 - Male: 251 (23%), female: 828 (77%).

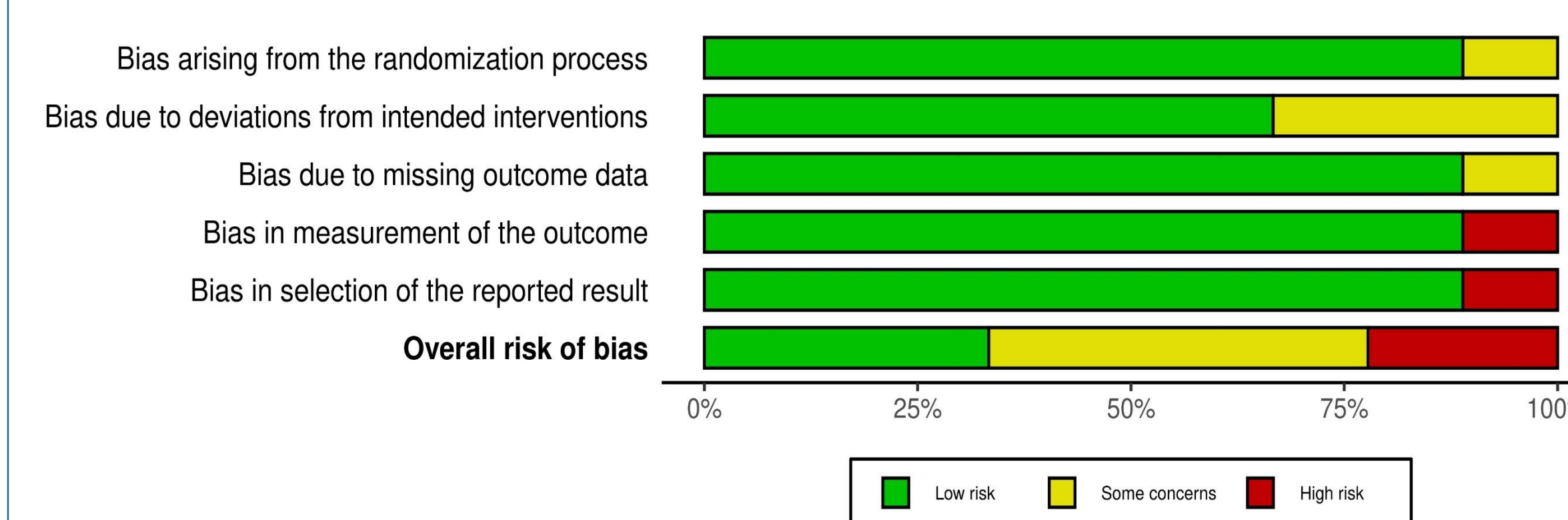
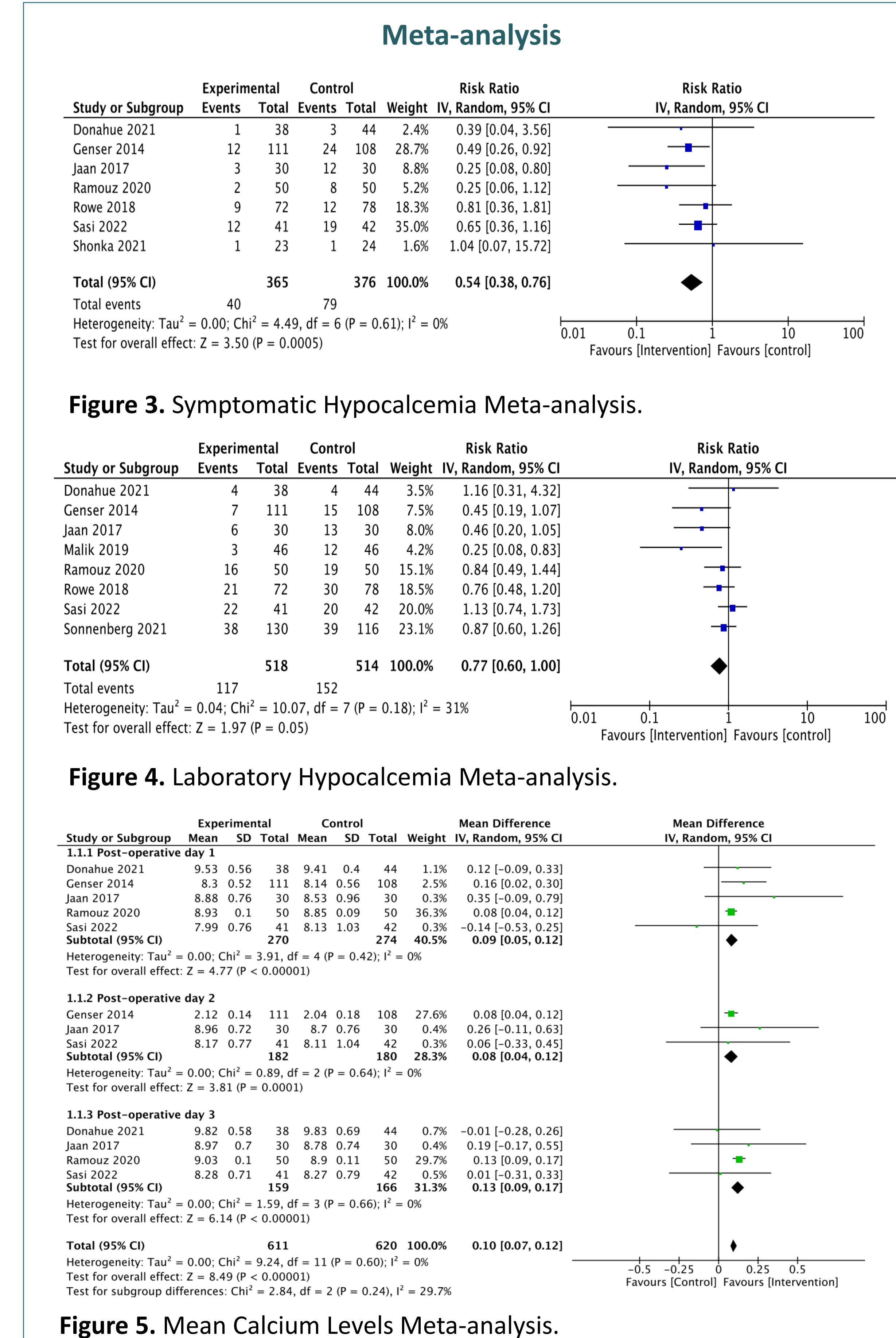


Figure 2. Risk of Bias Summary.

Risk of Bias Assessment (fig.2)

- **Low risk of bias:** 3 RCTs.
- **Some concern:** 4 RCTs.
- **High risk of bias:** 2 RCTs.



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